

CLOUD BASED E-GOVERNANCE MANAGEMENT SYSTEM

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ABSTRACT

Storing the data in Cloud Servers is meant for accessing the services over the internet. The primary key factor of depending on the cloud is to sustain the confidentiality of the data and to stop the unauthorized accessing. Cloud Servers gives ease accessing, robustness and portability to the data. Even though so many encrypting algorithms were made to secure the data but they are of limited functionality. In previous systems the data resides on the same machines of the servers which reduce its portability of transferring of the data over the machines. Building A Secure Storage System which can enhance the e-governance and the data management in the servers. We propose a system which can integrates the encrypting, managing and alerting the user for each action performed and justifying the authorization.

KEYWORDS: E-Government, Cloud Computing, Cloud Storage, Cloud Management Systems

INTRODUCTION

The concept of e-government was first introduced in 1990s when public organizations were under pressure to use modern information and communication technologies in order achieve the two objectives i.e. efficiency and effectiveness. Today almost every county in the world is making good use of modern computing technologies in order to provide governmental services to its citizens and businesses, and also to interact with other governments. [1]

One of the main aims of the government in providing the governmental services online is that citizens and businesses can access these services around the clock. That's why the e-government system should be accessible at any time and from anywhere. Cloud computing is on the Internet therefore it is always available and consumers can access the e-services 24/7 with just one PC and Internet connectivity [2].

E-Government applications usually require more secure and reliable authentication and identification mechanisms. Cloud providers already start supporting such mechanism for their cloud services. Cloud applications are easy to implement. Public services do not need to buy hardware or software licenses but just can use the IT infrastructure (IaaS, PaaS, or SaaS) of the cloud service provider. Usually, cloud service providers offer some kind of APIs (application programming interfaces), where individual cloud applications can be developed to. In general, cloud computing enables the provisioning of IT services such as computing power or data storage just on demand. Additionally, only those resources which have been effectively consumed are charged by a cloud service provider. [3].

Growing requirements of IT companies laid foundations to develop the Giant database servers, for fulfilling the demands of millions of users the imagination of huge databases are put in to practice and they achieved cloud computing, making the resources available on internet as an unified entity. With an increase in the uptake of cloud computing, business

and government organizations are scrutinizing data centers to a higher degree in areas such as security, availability, environmental impact and adherence to standards. Before Cloud Storages the data is used to be stored in traditional data center storages which encompass huge computer rooms. Cloud based E-governance management system is an integrated web application that handles various academic and non academic activities of a college/academic institute. The system can access by every student/faculties/employees of the institution through internet connected computers or internet enabled mobile devices with the aid of his username and password. A governance body is acting as an interface between the user and the cloud servers. There will be encryption between the user and central server and between the central server and cloud of servers. User details will be stored within the central server in the form of User ID etc and validation will be done accordingly. [5]

COMPARISION WITH EARLIER SYSTEM

Early computer systems were complex to operate and maintain, and required a special environment in which to operate. Many cables were necessary to connect all the components and methods to accommodate and organize these were devised, such as standard racks to mount equipment, raised floors, and cable trays. The advantages of cloud computing are easy access, robustness and portability of the data over the internet. With the support of cloud servers any E-governance systems are safely done and can easily maintain. E-governance may include several electronic projects which are complexly done manually such as the proposed system.

The manual process, receiving data's from students and staff details are done through manual records. These records are entered in manual process. In this process will take long time, separate workers need to maintaining the databases. All the college details are stored via separate databases. It will take long time due to this process time waste, money waste etc.

The main objective of this system is to provide a user-friendly interface. The system, which is proposed, now computerizes all the details that are maintained manually. The data is stored on the cloud servers for ease accessing of data over the internet.

Once the details are fed into the computer there is no need for various persons to deal with separate sections.

The security can also be given as per the requirement of the user

- Large volumes of data can be stored with ease.
- Maintenance of file is flexible.
- Records stored are updated now and then.
- Stored data and procedures can be easily edited.
- Accurate calculations are made.
- Less manpower required.

CLOUD COMPUTING STORAGE

Cloud Storage is a model of networked enterprise storage where data is stored in virtualized pools of storage which are generally hosted by third parties. Hosting companies operate large data centers, and people who require their

data to be hosted buy or lease storage capacity from them. The data center operators, in the background, virtualize the resources according to the requirements of the customer and expose them as storage pools, which the customers can themselves use to store files or data objects. [6]

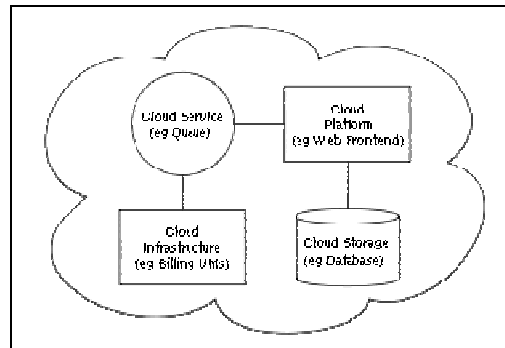


Figure 1: Cloud Computing Sample Architecture [6]

Cloud computing is an internet based technology, being used widely nowadays to enable the end user to create and use software without worrying about the execution of the technical information from anywhere at any time. Over the network the resources are utilized and after computation these are delivered as services in cloud computing. Cloud storage is a service for developers to store and access data in cloud. It deals with direct access to the storage and networking resources. Data are stored in the cloud through hosted network services and also it offers the use of access control in it. Cloud service provider will manage and control the cloud resources. Cloud service development encompasses services such as Software as a service (SaaS), Platform as a service (PaaS) and Infrastructure as a service (IaaS) and deployment models such as public cloud, private cloud and hybrid cloud. Using web browser protocols client-server works in cloud. Client uses the client devices to access a cloud system via World Wide Web. Many independent storage servers are used in the large scale distributed storage system like cloud. The benefits of the cloud storage are flexible with reduced cost and they also manage the data loss risk and so on. Recently many work focus towards third party auditing and the remote integrity checking, providing the data dynamics. Remote archive service is responsible for properly preserving the data. The remote data integrity checking protocol detects the data corruption and misbehaving server in the cloud storage [7]

CLOUD COMPUTING AND E-GOVERNMENT

Cloud computing could be defined as “a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” [4].

Cloud computing is penetrating many areas because of its advantages. High scalability, low maintenance efforts, enormous cost savings potential, and several other benefits make cloud computing also interesting in e-Government. Especially, the increasing tightness of governmental budgets can benefit from cloud computing adoption, as the amount of IT expenditures could be decreased [8]. Saving costs in the governmental sector is essential. For instance, the aim of decreasing costs for public services was similarly in their economic analysis of cloud computing for the public sector. Particularly, they argue that public clouds have always higher cost benefits for public services compared to private clouds, irrespective of the required amount of IT resources or the cloud size.

Besides cost benefits, cloud computing has several further advantages for public services. [9] lists a couple of advantages of cloud computing for the public sector. Based on these findings, we list the most important advantages of cloud computing in the governmental sector:

- Scalability.
- Pay-as-you-go pricing model.
- Easy implementation.
- Low maintenance.
- Availability.

One main advantage of cloud computing for public services is scalability. Depending on the e-Government application, only resources, which are actually required, are consumed. This especially helps to absorb high load peaks of applications (e.g e-Procurement, tendering, or election days), which may have higher access rates in a limited time period. The flexible pricing model of clouds allows for just paying the very amount of IT resources, which effectively have been consumed. This pay-as-you-go pricing model enables public services to save a lot of IT costs.

Cloud applications are easy to implement. Public services do not need to buy hardware or software licenses but just can use the IT infrastructure (IaaS, PaaS, or SaaS) of the cloud service provider. Usually, cloud service providers offer some kind of APIs (application programming interfaces), where individual cloud applications can be developed to.

The use of cloud services also lowers maintenance tasks. Patch or update management can be fully handled by the cloud service provider, hence no manual maintenance tasks, e.g. for updating operating systems or installing security patches, are required.

Finally, the use of clouds can increase availability of applications. Applications can be deployed in different cloud data centers, distributed around the world. In case of a breakdown of one data center, the application may still continue running in another cloud data center of the cloud provider

CLOUD MANAGEMENT SYSTEMS

A cloud management system is a combination of software and technologies designed to manage cloud environments. The industry has responded to the management challenges of cloud computing with cloud management systems. At a minimum, a cloud management solution should be able to manage a pool of heterogeneous compute resources, provide access to end users, monitor security, manage resource allocation and manage tracking. For composite applications, cloud management solutions also encompass frameworks for workflow mapping and management. Enterprises with large-scale cloud implementations may require more robust cloud management tools that include specific characteristics, such as the ability to manage multiple platforms from a single point of reference, include intelligent analytics to automate processes like application lifecycle management. And high-end cloud management tools should also be able to handle system failures automatically with capabilities such as self-monitoring, an explicit notification mechanism, and include failover and self-healing capabilities. [10]

SYSTEMDESIGN AND DEVELOPMENT

Practically all use of database occurs from within application programs. The most common way in which users interacts with databases is through an application program that provides a user interface at the front end, and interfaces with a database at the backend. Such application take input from users, typically through a forms-based interface, and either enter data into a database or extract information from a database based on the user input, and generate output, which is displayed to the user.

Middle layer between front end and backend which contain “business logic” that is code that executes specific request for information or updates ,enforcing rules of business such as what Actions should be carried out to execute a given task or who can carry out what task. Web browser provides the front end for user interaction, application programs constitute the back end. typically request from a browser are sent to web server, which in turn executes an application program to process the request .the application program typically communicates with database server, through ODBC, JDBC, or other protocols[11].A web application is defined as an application that can be accessed through the internet by using a web protocol such as (HTTP),by a client application such as web browser ,web application can be developed by using different technologies such as java servlet [12]. Cloud based E-government management system is an integrated web application that handles various academic and non academic activities of a college/academic institute. A governance body is acting as an interface between the user and the cloud servers. Every user will have a customized home page with his/her profile management facilities. Through links that displays in the home page the user can access different options of the website assigned to him. A self driven module in the system will accomplish the automated tasks such as Email Alerts and Notifications to the administrator etc.

System Process Model

To solve actual problems in an industry setting, a software engineer or a team of engineers must incorporate a development strategy that encompasses that process, methods, and tools. This strategy is often referred to as process model or a software engineering paradigm. A process model for software engineering is chosen based on the nature of the project and application, the methods and tools to be used and the controls and the deliverables that are required. So, the system application is based on the **Object Oriented Approach**. In this model we design the UML diagrams like Use case.

Identification of Actors

Actor: Actor represents the role a user plays with respect to the system. An actor interacts with, but has no control over the use cases. An actor is someone or something that:

- Interacts with or uses the system.
- Provides input to and receives information from the system.
- Is external to the system and has no control over the use cases.

The actors identified in this system are:

- Admin.
- College Admin.

- Staff member.
- Student.

Admin: He is the one who uses the system to govern everything in the project and he can manage the Colleges involving in affiliation of the particular university. He will schedule the notification for exams.

College Admin: He is the one who controls overall operations of the staff and students. He is responsible for sending email alerts to the students/staff when their accounts are created .He integrates with the database for the stored information.

Staff Member: Staff Member is an actor such as lecturer in the college. There are no special duties involving this user except contacting the students and the other faculty.

Student: Student can login in to his account and he has option to view marks and update his profile and contacting to other students.

Identification of Use Cases

Use Case: A use case can be described as a specific way of using the system from a user's (actor's) perspective. Use cases are best discovered by examining the actors and defining what the actor will be able to do with the system.

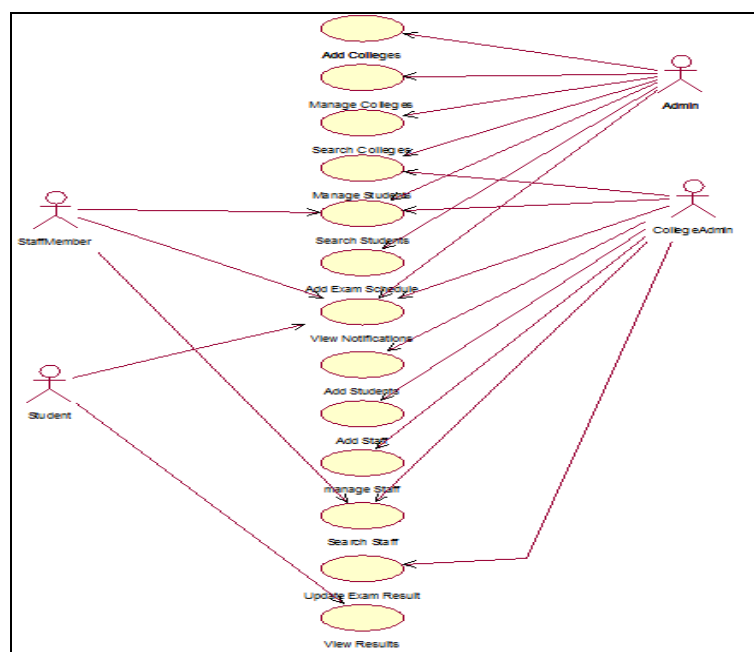


Figure 2: Use Case Diagram of the System

System Application

In order the Cloud based E-government management system it is an integrated web application and it is designed to access as we shown in figure 2 by the Admin/student/college admin/Staff Member of the system through internet connected computers or internet enabled mobile devices with the aid of his username and password. User details will be stored within the central server in the form of User ID etc and validation will be done accordingly.

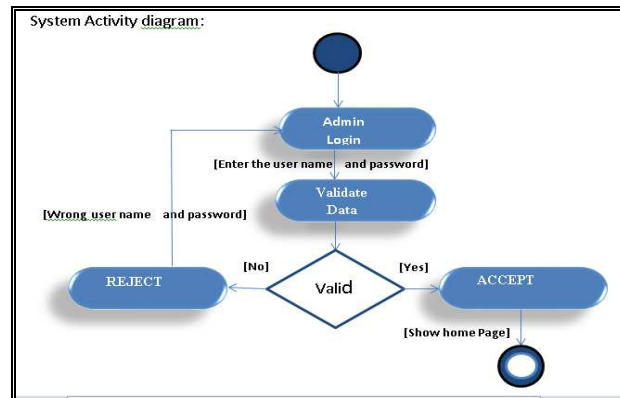


Figure 3: Admin Login Activity Diagram

Every system's actors will have a customized home page with his/her profile management facilities. Through links that displays in the home page the user can access different options of the website assigned to him. The functional requirement in this system is to enrollment of a College into the forum like Registration- Enroll the College to use current system. To Provisioning the Criteria for Registration College name, College Code, emailed, Address, (add colleges) as show in figure 4 below

The screenshot shows the 'UNIVERSITY SECTION' header with navigation links: Home, College Section, Student Section, Exams Section, My Account, Logout, and a 'REGISTER' button. Below the header is the 'Add New College' form with the following fields:

- College Name*
- College Code*
- Email*
- Address*

An 'Add' button is located at the bottom of the form.

Figure 4: Admin Add New College Page

And Gives notifications to users for every Activity like: password must be numeric and alphabets and Queries: Is it free registration?. Maintaining details of colleges (manage collage, Search College). Maintaining details of Students, Staff and College admin. Storing the notifications in the database by the admin and making them visible. Updating status of the users Sending Alerts to particular users

The screenshot shows the 'UNIVERSITY SECTION' header with navigation links: Home, College Section, Student Section, Exams Section, My Account, Logout, and a 'REGISTER' button. Below the header is the 'View Exam Notifications' table:

Exam Code	Exam Name	Exam Date	Notification
1	SupriseTest	2014-05-02	Downloaded Notification
2	exam1	2014-05-10	Downloaded Notification
3	ref	2014-10-10	Downloaded Notification

At the bottom of the page, it says: © 2014 EndApps. All Right Reserved.

Figure 5: Viewing Exam Notification Page by Admin

Figure 6: College Admin Update Exams Results Page

CONCLUSIONS

Cloud based E-governance management system is to provide a user-friendly interface. By this system, now computerizes all the details that are maintained manually. The data is stored on the cloud servers for ease accessing of data over the internet. The advantages of cloud computing are easy access, robustness and portability of the data over the internet. With the support of cloud servers any E-governance systems are safely done and can easily maintain. A governance body is acting as an interface between the user and the cloud servers. Actors details will be stored in the server in the form of User ID etc and validation will be done accordingly. Once the details are fed into the computer there is no need for various persons to deal with separate sections. Before Cloud Storages the data is used to be stored in traditional data center storages which encompass huge computer rooms. Building A Secure Storage System which can enhance the e-governance and the data management in the servers

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